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Nursery school: After initial setback, trout growing strong in joint project on Youghiogheny River

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By Ben Moyer

Plump rainbow and palomino trout -- about 2,700 of them -- are once again finning against the Youghiogheny River current inside Pennsylvania's first cage culture trout nursery. The trout had served a seven-month stint at other nearby nurseries after high concentrations of nitrogen in the Yough nursery water claimed some of the original fingerlings placed in the cage last July.

The cage culture nursery is the brainchild and pet project of the Chestnut Ridge Chapter of Trout Unlimited, headquartered at Uniontown. Its existence and ultimate success, however, are due to a committed partnership involving TU, the U.S. Army Corps of Engineers which is responsible for the dam and its reservoir, D&R Hydro, operators of a hydroelectric plant at the outflow, and the Fish and Boat Commission, which oversees the nursery as part of its Cooperative Nursery program and supplies the fingerling trout. Fish and Boat also supplied Chestnut Ridge with an initial \$1,000 grant to purchase needed equipment.

Chestnut Ridge member, Tom Shetterly, of Perryopolis, spearheaded the project after visiting a similar facility operated by the Maryland DNR at the tailrace of the Jennings Randolph Dam on the North Fork of the Potomac River. Shetterly designed the nursery, which was built through the volunteer efforts of Local 354, United Association of Plumbers and Pipefitters of Youngwood.

Located near Confluence, at the base of the Youghiogheny Dam, the nursery is roughly the size and shape of a semi-trailer. It consists of an open steel frame and six separate chambers lined with 1/2-inch netting to hold the trout. The cage is made buoyant by sealed 10-inch PVC pipe fitted to its top, and the entire assembly floats up and down with the river level on piers embedded in the bottom. Instead of being confined in a concrete raceway, the trout in the net-lined chambers enjoy a constant exchange of clean river water passing through the nursery. And, since water flows out of the Youghiogheny Reservoir from the bottom of the dam, the discharge remains cold enough for trout survival throughout the summer.

Shetterly says the cage culture technique offers a range of advantages

over conventional raceway rearing including lower cost per pound of trout produced and faster growth.

But the nursery suffered a setback last summer when some of the initial complement of 6,500 fingerlings died soon after they were placed in the cages. Nursery manager and Chestnut Ridge member, Rick McClintock, of Markleysburg, said the partnership initially suspected a bacterial infection had stricken the confined population. Closer examination of the dead trout, however, revealed they had succumbed to unnaturally high concentrations of nitrogen in their surroundings.

"It's perfectly understandable how it happened," McClintock said. "Last summer the river level dropped very low during the drought, and when the flow drops so does the level of dissolved oxygen which is necessary for aquatic life. To protect fish and insect life downriver, D&R Hydro is required by the Federal Energy Regulatory Commission to maintain dissolved oxygen levels in the river of at least 7.5 parts per million (ppm). To meet that requirement, D&R pumps air directly from the atmosphere into the discharge. That raises the level of dissolved oxygen, but since the atmosphere is mostly nitrogen, it also raises the nitrogen concentration."

McClintock, who is also Director of Residential Services at the Pressley Ridge School at Ohiopyle, explained that the oxygen enhancement technique has never affected free-swimming fish in the river or tailrace because nitrogen is extremely unstable in the aquatic environment, and quickly dissipates. Even fish living right at the dam discharge can escape dangerous nitrogen levels by sounding to the bottom, where concentrations are lower. The trout in the cage nursery were unable to reach the bottom and, as a result, were subjected to sustained nitrogen concentrations that free-swimming fish could easily escape.

Nitrogen kills and injures fish by expanding, and attempting to return to the atmosphere after being introduced into the bloodstream through the gills. As the unstable nitrogen gas expands, it injures fragile tissues within the body, especially the eyes. Since the eyes contain some of the most delicate structures in fish anatomy, nitrogen poisoning often reveals itself in swollen or ruptured eye tissue, a condition known as "pop-eye." The condition is similar to that experienced by human deep sea divers when they ascend too quickly from a dive.

Surviving trout were moved last August to the Wagner Cooperative Nursery in Meyersdale and the Bakersville Cooperative Nursery, where they remained during the low-water period of late fall and through the winter.

Higher flows and improved ambient dissolved oxygen levels this spring allowed the trout to be returned to the Yough cage nursery. "Talk about high-level cooperation," McClintock said, "Cecil Houser, director of Fish and Boat's entire statewide Cooperative Nursery program personally drove the fish truck down from Bellefonte so we could move the trout back from the Wagner and Bakersville co-ops."

Since their re-introduction, the Yough cage culture trout have shown impressive growth. "When we put them back in on Good Friday, a random sample showed we had 52 pounds per 100 fish," McClintock said. "By last week (mid-May), that was up to 62 pounds per 100 fish. They're growing really nicely in here. There are some nice plump individuals that are pushing 16 inches in length."

The U.S. Army Corps of Engineers has shown keen interest in the project as a possible addition to other Corps sites with coldwater discharge reservoirs.

"This is an outstanding first effort at producing trout in a tailrace situation," said Mike Fowles, U.S. Army Corps Fish and Wildlife Specialist with responsibility for wildlife affairs at 16 Corps reservoirs in the agency's Pittsburgh District. "We encountered some initial problems but everyone involved believes we can tweak this program to get the results we want. The folks at D&R Hydro have been extremely cooperative in making this project become a reality and an eventual success, and there is obviously no shortage of commitment and enthusiasm among the Chestnut Ridge Trout Unlimited membership."

McClintock travels over the mountain from Ohiopyle every day after work to feed and check on the trout. "Sometimes I bring my kids along," he said. "They love the playground the Corps has here at the outflow, so I've been able to make it a family thing."

"We're a little surprised at how rapid their growth has been. But since I've been coming up here every day I've noticed there is a lot of natural food in the water that the trout are utilizing in addition to our feeding. There is a dense population of midge larvae that lives on and around the netting. I've watched the trout feed continuously on those midges. I think that constant source of quality food maintains a high level of metabolism which may be exhibited in this fast growth rate we've seen."

McClintock explained that plans are in place to avoid the nitrogen problem that plagued the nursery in its initial summer. Chestnut Ridge has applied for additional grant money and, if successful, will use the funds to buy a pair of sophisticated "lift pumps" which will be installed in the nursery.


"The lift pumps lift water up and spray it into the air," McClintock explained. "As it falls back to the surface, the unstable nitrogen dissipates out into the atmosphere. D&R Hydro has committed to running lines from the powerhouse to the nursery and to supplying the power needed. The pumps, combined with the addition of external baffles to direct and restrict the flow at critical times, should keep nitrogen concentrations in the nursery below the lethal threshold."

McClintock said the nursery's maiden stocking was accomplished in early May when 325 cage-cultured trout were released in the Casselman River in a cooperative effort with Turkeyfoot Fish & Game which contributed 600 fish of its own. Chestnut Ridge TU plans to stock all but

800 of the remaining 2,700 trout by July 1, in waters open to public fishing in the Youghiogheny River watershed.

"We're going to hold 800 in one of the nets and keep them for another year," McClintock said. "At the rate they're going, they'll be real beauties by this time next summer. The angler who catches one of those trout will have a Youghiogheny memory to last a lifetime."

The release of 2,100 trout won't mean a rest for McClintock and his colleagues. Another shipment of 6,200 rainbow, brook and palomino fingerlings is due to arrive at the "cage" on July 12.

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